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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 10/594,114 | 09/25/2006 | Hideo Noro | 00862.109670. | 7038 |

5514 7590 07/06/2009
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| EXAMINER | |
|---|---|
| MARTELLO, EDWARD | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2628 | |

| MAIL DATE | DELIVERY MODE |
|---|---|
| 07/06/2009 | PAPER |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/594,114 | NORO ET AL. | |
| | **Examiner** | **Art Unit** | |
| | Edward Martello | 2628 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *04 June 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *10-16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *10-16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

## DETAILED ACTION

### *Continued Examination Under 37 CFR 1.114*

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 4 June 2009 has been entered.

2. Claims 10, 15 and 16 are amended, claims 11-14 are as previously presented and claims 1-9 were previously cancelled.

### *Specification*

3. The abstract of the disclosure is objected to because the latest version of the abstract received 4 June 2009 is composed of 177 words which still exceeds the 150 word limit imposed upon an abstract. Correction is required. See MPEP § 608.01(b).

4. The amendment of the claims has necessitated the new grounds of rejection that follow.

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. Claims 10 and 13-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Williamson et al. (U. S. Patent Application Publication 2004/0104935 A1, hereafter '935) and further in view of Jaszlics et al. (U. S. Patent 6,166,744, already of record, hereafter '744).

6. In regard to claim 10 (Currently Amended), Williamson teaches an image processing apparatus for composting an image of a virtual object and an image of a physical space to generate a mixed reality image and causing an HMD to display the mixed reality image ('935; abstract; fig. 6; ¶ 0224), comprising: a database which holds data used for generating the image of the virtual object ('935; fig. 1; 3D model extraction and hard disk storage; ¶ 0060; ¶ 0069-0074); an image capturing unit which is attached to the HMD and captures the image of the physical space ('935; HMD with a camera attached, ¶ 0224); a first measurement unit which measures a position and orientation of the HMD ("935; camera and targets; abstract; ¶ 0021-0024); but does not teach an object manipulation unit which is used by a user in order to operate a position and orientation of the virtual object; a second measurement unit which measures a position and orientation of said object manipulation unit; an operation panel which is positioned in the physical space, displays an operation panel image used for editing the virtual object, and is capable of receiving a user instruction of editing the virtual object; an operation panel image generation unit which generates the operation panel image by using the data held in said database, and outputs the generated operation panel image to said operation panel; a rendering unit which updates the data held in said database according to the user instruction received via

said operation panel and the measurement result of said second measurement unit, and renders, by using the updated data, the image of the virtual object according to the measurement results of said first and second measurement units; and continues teaching a composition unit which composites the image of the virtual object rendered by said rendering unit and the image of the physical space captured by said image capturing unit to generate the mixed reality image ('935; fig. 17, element 1707; ¶ 0297-0299); and an HMD which displays the mixed reality image generated by said composition unit ('935; fig. 17, element 1707; ¶ 0297-0299). Jaszlics, working in the same field of endeavor, however teaches an object manipulation unit which is used by a user in order to operate a position and orientation of the virtual object ('744; joystick; col. 10, ln. 35-38; col. 11, ln. 47-56); a second measurement unit which measures a position and orientation of said object manipulation unit; ('744; sensors within the joystick that determine the position of the control stick; col. 11, ln. 47-56) an operation panel which is positioned in the physical space ('744; fig. 16, Display A), displays an operation panel image ('744; fig. 21) used for editing the virtual object, and is capable of receiving a user instruction of editing the virtual object ('744; fig. 21; col. 15, ln 5-25) ); an operation panel image generation unit which generates the operation panel image by using the data held in said database ('744; fig. 20 & 22; virtual simulation computer), and outputs the generated operation panel image to said operation panel ('744; fig. 20 & 22; virtual simulation computer); a rendering unit which updates the data held in said database according to the user instruction received via said operation panel and the measurement result of said second measurement unit, and renders, by using the updated data, the image of the virtual object according to the measurement results of said first and second measurement units ('744; fig. 2, 20 & 22; virtual simulation computer; col. 8, ln. 6-50) for the

benefit of allowing the user to control the virtual object(s) within the mixed reality environment. It would have been obvious to one of ordinary skill in the art at the time of the invention to have combined the VR teachings of Williamson using a head mounted display coupled with a head mounted camera and head/body location techniques with the virtual object controlling teachings of Jaszlics for the benefit of allowing the user to control the virtual object(s) within the mixed reality environment.

7. Regarding claim 13 (Previously Presented), Williamson and Jaszlics teach the apparatus according to claim 10 and Jaszlics further teaches wherein said operation panel includes a display device ('744; fig. 16, Display A) and an operation device ('744; joystick; col. 10, ln. 35-38; col. 11, ln. 47-56), wherein the display device displays the operation panel image, and wherein the operation device is used for inputting the user instruction.

8. In regard to claim 14 (Previously Presented), Williamson and Jaszlics teach the apparatus according to claim 10 and Williamson further teaches wherein the HMD can present the mixed reality image to two eyes of a user who wears the HMD ('935; fig. 16, element 1603; ¶ 0293-0295).

9. Regarding claim 15 (Currently Amended) Williamson teaches an image processing method of composting an image of a virtual object and <u>an image of</u> a physical space to generate a mixed reality image and causing an HMD to display the mixed reality image ('935; abstract; fig. 6; ¶ 0224), comprising the steps of: holding data used for generating the image of the virtual object in a database ('935; fig. 1; 3D model extraction and hard disk storage; ¶ 0060; ¶ 0069-0074); providing an image capturing unit, which is attached to the HMD ('935; HMD with a camera attached, ¶ 0224), to capture <u>the image of</u> the physical space ('935; abstract; fig. 6; ¶

0224); measuring a position and orientation of the HMD with a first measurement unit ('935; camera and targets; abstract; ¶ 0021-0024); but does not teach operating an object manipulation unit, by a user, in order to position and orient the virtual object; measuring a position and orientation of the object manipulation unit with a second measurement unit; positioning an operation panel in a physical space to display an operation panel image used for editing the virtual object, the operation panel being capable of receiving a user instruction of editing the virtual object; generating the operation panel image by using the data held in the database with an operation panel image generation unit <u>and outputting the generated operation panel image to the operation panel</u>; updating the data held in the database according to the user instruction received via the operation panel and the measurement result of the second measurement unit, and rendering, by using the updated data, the image of the virtual object according to the measurement results of the first and second measurement units; and Williamson continues teaching compositing the rendered image of the virtual object and the captured <u>image of the</u> physical space to generate the mixed reality image ('935; fig. 17, element 1707; ¶ 0297-0299); and displaying the generated mixed reality image on an HMD ('935; fig. 17, element 1707; ¶ 0297-0299). Jaszlics, working in the same field of endeavor, however teaches operating an object manipulation unit, by a user, in order to position and orient the virtual object ('744; joystick; col. 10, ln. 35-38; col. 11, ln. 47-56); measuring a position and orientation of the object manipulation unit with a second measurement unit ('744; sensors within the joystick that determine the position of the control stick; col. 11, ln. 47-56); positioning an operation panel in a physical space to display an operation panel image used for editing the virtual object ('744; fig. 16, Display A), the operation panel being capable of receiving a user instruction of editing the

virtual object ('744; fig. 21; col. 15, ln 5-25); generating the operation panel image by using the data held in the database with an operation panel image generation unit <u>and outputting the generated operation panel image to the operation panel</u> ('744; fig. 20 & 22; virtual simulation computer); updating the data held in the database according to the user instruction received via the operation panel and the measurement result of the second measurement unit, and rendering, by using the updated data, the image of the virtual object according to the measurement results of the first and second measurement units ('744; fig. 2, 20 & 22; virtual simulation computer; col. 8, ln. 6-50) for the benefit of allowing the user to control the virtual object(s) within the mixed reality environment. It would have been obvious to one of ordinary skill in the art at the time of the invention to have combined the VR teachings of Williamson using a head mounted display coupled with a head mounted camera and head/body location techniques with the virtual object controlling teachings of Jaszlics for the benefit of allowing the user to control the virtual object(s) within the mixed reality environment.

10. 16. (Currently Amended) A computer-readable storage medium encoded with a computer program ('935; fig. 16; computer and memory) for an image processing method of composting an image of a virtual object and <u>an image of</u> a physical space to generate a mixed reality image and causing an HMD to display the mixed reality image ('935; abstract; fig. 6; ¶ 0224), comprising the steps of: holding data used for generating the image of the virtual object in a database ('935; fig. 1; 3D model extraction and hard disk storage; ¶ 0060; ¶ 0069-0074); providing an image capturing unit, which is attached to the HMD ('935; HMD with a camera attached, ¶ 0224), to capture the <u>image of the</u> physical space; measuring a position and orientation of the HMD with a first measurement unit ("935; camera and targets; abstract; ¶

0021-0024); but does not teach operating an object manipulation unit, by a user, in order to position and orient the virtual object; measuring a position and orientation of the object manipulation unit with a second measurement unit; positioning an operation panel in a physical space to display an operation panel image used for editing the virtual object, the operation panel being capable of receiving a user instruction of editing the virtual object; generating the operation panel image by using the data held in the database with an operation panel image generation unit and outputting the generated operation panel image to the operation panel; updating the data held in the database according to the user instruction received via the operation panel and the measurement result of the second measurement unit, and rendering, by using the updated data, the image of the virtual object according to the measurement results of the first and second measurement units; and Williamson continues teaching compositing the rendered image of the virtual object and the captured image of the physical space to generate the mixed reality image ('935; fig. 17, element 1707; ¶ 0297-0299); and displaying the generated mixed reality image on an HMD ('935; fig. 17, element 1707; ¶ 0297-0299). Jaszlics, working in the same field of endeavor, however teaches operating an object manipulation unit, by a user, in order to position and orient the virtual object ('744; joystick; col. 10, ln. 35-38; col. 11, ln. 47-56); measuring a position and orientation of the object manipulation unit with a second measurement unit ('744; sensors within the joystick that determine the position of the control stick; col. 11, ln. 47-56); positioning an operation panel in a physical space to display an operation panel image used for editing the virtual object ('744; fig. 16, Display A), the operation panel being capable of receiving a user instruction of editing the virtual object; generating the operation panel image by using the data held in the database with an operation panel image generation unit and outputting

the generated operation panel image to the operation panel ('744; fig. 20 & 22; virtual simulation computer); updating the data held in the database according to the user instruction received via the operation panel and the measurement result of the second measurement unit ('744; fig. 2, 20 & 22; virtual simulation computer; col. 8, ln. 6-50), and rendering, by using the updated data, the image of the virtual object according to the measurement results of the first and second measurement units ('744; fig. 2, 20 & 22; virtual simulation computer; col. 8, ln. 6-50) for the benefit of allowing the user to control the virtual object(s) within the mixed reality environment. It would have been obvious to one of ordinary skill in the art at the time of the invention to have combined the VR teachings of Williamson using a head mounted display coupled with a head mounted camera and head/body location techniques with the virtual object controlling teachings of Jaszlics for the benefit of allowing the user to control the virtual object(s) within the mixed reality environment.

11. Claims 11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Williamson et al. (U. S. Patent Application Publication 2004/0104935 A1, hereafter '935) as applied to claims 10 and 13-16 above and in view of Jaszlics et al. (U. S. Patent 6,166,744, already of record, hereafter '744) as applied to claims 10 and 13-16 above, and further in view of Lescinsky et al. ("Interactive Scene Manipulation in the Virtue3D System," ACM Weg3D'02, pp. 127-135, February 24-28, 2002, Tempe, Arizona, ACM 1-58113-468-1/02/0002, already of record, hereafter '468).

12. Regarding claim 11 (Previously Presented), Williamson and Jaszlics teach the apparatus according to claim 10 but do not teach wherein the image of the virtual object is generated on the basis of 3D CAD data of the virtual object, and said operation panel displays an assembly tree

based on the 3D CAD data. Lescinsky, working in the same field of endeavor, however, teaches wherein the image of the virtual object is generated on the basis of 3D CAD data of the virtual object, and said operation panel displays an assembly tree based on the 3D CAD data ('468; fig. 4, pg. 133, § 8-9) for the benefit of providing tools to allow easy to use scene authoring and manipulation of content within the virtual 3D mixed reality environment. It would have been obvious to one of ordinary skill in the art at the time of the invention to have combined the VR apparatus teachings of Williamson and Jaszlics with the explicit VRML tree teachings of Lescinsky for benefit of providing tools to allow easy to use scene authoring and manipulation of content within the virtual 3D mixed reality environment.

13. In regard to claim 12 (Previously Presented), Lescinsky further teaches wherein a part, which is obtained by enlarging a designated part of the assembly tree included in the operation panel image, includes a component name contained in the assembly tree ('468; fig. 4, pg. 133, § 8-9).

***Response to Arguments***

14. Applicant's arguments with respect to claims 10-16 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

The following prior art, made of record, was not relied upon but is considered pertinent to applicant's disclosure:

| | |
|---|---|
| US 6629065 B1 | Methods and apparatus for rapid computer-aided design of objects in virtual reality and other environments |

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Edward Martello whose telephone number is (571) 270-1883. The examiner can normally be reached on M-F 7:30-5:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Xiao Wu can be reached on (571) 272-7761. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/EM/

Examiner, Art Unit 2628

/XIAO M. WU/
Supervisory Patent Examiner, Art Unit 2628